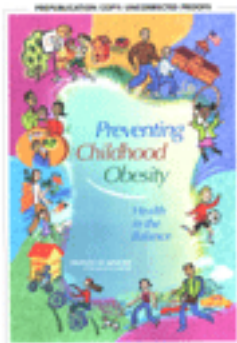


## Free Executive Summary

### Preventing Childhood Obesity: Health in the Balance



Jeffrey P. Koplan, Catharyn T. Liverman, and Vivica A. Kraak, Editors, Committee on Prevention of Obesity in Children and Youth

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*Children's health has made tremendous strides over the past century. In general, life expectancy has increased by more than thirty years since 1900 and much of this improvement is due to the reduction of infant and early childhood mortality. Given this trajectory toward a healthier childhood, we begin the 21st-century with a shocking development—an epidemic of obesity in children and youth. The increased number of obese children throughout the U.S. during the past 25 years has led policymakers to rank it as one of the most critical public health threats of the 21st-century. Preventing Childhood Obesity provides a broad-based examination of the nature, extent, and consequences of obesity in U.S. children and youth, including the social, environmental, medical, and dietary factors responsible for its increased prevalence. The book also offers a prevention-oriented action plan that identifies the most promising array of short-term and longer-term interventions, as well as recommendations for the roles and responsibilities of numerous stakeholders in various sectors of society to reduce its future occurrence. Preventing Childhood Obesity explores the underlying causes of this serious health problem and the actions needed to initiate, support, and sustain the societal and lifestyle changes that can reverse the trend among our children and youth.*

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## Executive Summary

Despite steady progress over most of the past century toward assuring the health of our country's children, we begin the 21st century with a startling set-back—an epidemic of childhood obesity. This epidemic is occurring in boys and girls in all 50 states, in younger children as well as adolescents, across all socioeconomic strata, and among all ethnic groups—though specific subgroups, including African Americans, Hispanics, and American Indians, are disproportionately affected. At a time when we have learned that excess weight has significant and troublesome health consequences, we nevertheless see our population, in general, and our children, in particular, gaining weight to a dangerous degree and at an alarming rate.

The increasing prevalence of childhood obesity<sup>1</sup> throughout the United States has led policy makers to rank it as a critical public health threat. Over the past three decades, its rate has more than doubled for preschool children ages 2 to 5 years and adolescents ages 12 to 19 years, and it has more than tripled for children ages 6 to 11 years. At present, approximately nine million children over 6 years of age are considered obese. These trends mirror a similar profound increase over the same approximate period in U.S. adults as well as a concurrent rise internationally, in developed and developing countries alike.

Childhood obesity involves immediate and long-term risks to physical health. For children born in the United States in 2000, the lifetime risk of being diagnosed with type 2 diabetes at some point in their lives is estimated at 30 percent for boys and 40 percent for girls, if obesity rates level off. Young people are also at risk of developing serious psychosocial burdens related to being obese in a society that stigmatizes this condition.

There are also considerable economic costs. The national health care expenditures related to obesity and overweight in adults alone have been estimated to range from approximately \$98 billion to \$129 billion after adjusting for inflation and converting estimates to 2004 dollars. Understanding the causes of childhood obesity, determining what to do about them, and taking appropriate action require attention to what influences eating behaviors and physical activity levels, because obesity prevention involves a focus on energy balance (calories consumed versus calories expended). Although seemingly straightforward, these behaviors result from complex interactions across a number of relevant social, environmental, and policy contexts.

U.S. children live in a society that has changed dramatically in the three decades over which the obesity epidemic has developed. Many of these changes—such as both parents working outside the home, longer work hours by both parents, changes in the school food environment, and more meals eaten outside the home, together with changes in the physical design of communities often affect what children eat, where they eat, how much they eat, and the amount of energy they expend in school and

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<sup>1</sup>Reflecting classification based on the readily available measures of height and weight, this report uses the term “obesity” to refer to children and youth who have a body mass index (BMI) equal to or greater than the 95th percentile of the age- and gender-specific BMI charts of the Centers for Disease Control and Prevention (CDC). In most children, such BMI values are known to indicate elevated body fat and to reflect the presence or risk of related diseases.

leisure time activities. Other changes, such as the growing diversity of the population, influence cultural views and marketing patterns. Use of computers and video games, along with television viewing, often occupy a large percentage of children's leisure time and potentially influence levels of physical activity for children as well as for adults. Many of the social and cultural characteristics that the U.S. population has accepted as a normal way of life may collectively contribute to the growing levels of childhood obesity. An understanding of these contexts, particularly regarding their potential to be modified and how they may facilitate or impede development of a comprehensive obesity prevention strategy, is essential for reducing childhood obesity.

### **DEVELOPING AN ACTION PLAN FOR OBESITY PREVENTION**

The Institute of Medicine (IOM) Committee on Prevention of Obesity in Children and Youth was charged with developing a prevention-focused action plan to decrease the prevalence of obesity in children and youth in the United States. The primary emphasis of the committee's task was on examining the behavioral and cultural factors, social constructs, and other broad environmental factors involved in childhood obesity and identifying promising approaches for prevention efforts. The plan consists of explicit goals for preventing obesity in children and youth and a set of recommendations, all geared toward achieving those goals, for different segments of society (Box ES-1).

Obesity prevention requires an evidence-based public health approach to assure that recommended strategies and actions will have their intended effects. Such evidence is traditionally drawn from experimental (randomized) trials and high-quality observational studies. However, there is limited experimental evidence in this area, and for many environmental, policy, and societal variables, carefully-designed evaluations of ongoing programs and policies are likely to answer many key questions. For this reason, the committee chose a process that incorporated all forms of available evidence—across different categories of information and types of study design—to enhance the biological, psychosocial, and environmental plausibility of its inferences and to assure consistency and congruency of information.

#### BOX ES-1

##### Goals of Obesity Prevention in Children and Youth

The goal of obesity prevention in children and youth is to create—through directed social change—an environmental-behavioral synergy that promotes:

- **For the *population* of children and youth**
  - reduction in the incidence of childhood and adolescent obesity
  - reduction in the prevalence of childhood and adolescent obesity
  - reduction of mean population BMI levels
  - improvement in the proportion of children meeting Dietary Guidelines for Americans
  - improvement in the proportion of children meeting physical activity guidelines
  - achieving physical, psychological, and cognitive growth and developmental goals
- **For *individual* children and youth**
  - a healthy weight trajectory, as defined by the CDC BMI charts
  - a healthful diet (quality and quantity)
  - appropriate amounts and types of physical activity
  - achieving physical, psychosocial, and cognitive growth and developmental goals

Because it may take a number of years to achieve and sustain these goals, intermediate goals are needed to assess progress towards reduction of obesity through policy and system changes. Examples include:

- increased number of children who safely walk and bike to school;
- improved access to and affordability of fruits and vegetables for low-income populations;
- increased availability and use of community recreational facilities;
- increased play and physical activity opportunities;
- increased number of new industry products and advertising messages that promote energy balance at a healthy weight;
- increased availability and affordability of healthful foods and beverages at supermarkets, grocery stores, and farmers markets located within walking distance of the communities they serve;
- changes in institutional and environmental policies that promote energy balance.

Because the obesity epidemic is a serious public health problem calling for immediate reductions in obesity prevalence and in its health and social consequences, the committee believed strongly that actions should be based on the best *available* evidence—as opposed to waiting for the

best *possible* evidence. However, there is an obligation to accumulate appropriate evidence not only to justify a course of action but to assess whether it has made a difference. Therefore, evaluation should be a critical component of any implemented intervention or change.

Childhood obesity prevention involves maintaining energy balance at a healthy weight while protecting overall health, growth and development, and nutritional status. The balance is between the energy an individual consumes as food and beverages and the energy expended to support normal growth and development, metabolism, thermogenesis, and physical activity. Although the “energy intake = energy expenditure” looks like a fairly basic equation, in reality it is extraordinarily complex when considering the multitude of genetic, biological, psychological, sociocultural, and environmental factors that affect both sides of the equation and the interrelationships between these factors. For example, children are strongly influenced by the food- and physical activity-related decisions made by their families, schools, and communities. Furthermore, it is important to consider the kinds of foods and beverages that children are consuming over time, given that specific types and quantities of nutrients are required to support optimal growth and development.

Thus, changes at many levels and in numerous environments will require the involvement of multiple stakeholders from diverse segments of society. In the home environment, for example, incremental changes such as improving the nutritional quality of family dinners or increasing the time and frequency that children spend outside playing can make a difference. Changes that lead to healthy communities, such as organizational and policy changes in local schools, school districts, neighborhoods, and cities, are equally important. At the state and national levels, large-scale modifications are needed in the ways in which society promotes healthful eating habits and physically active lifestyles. Accomplishing these changes will be difficult, but there is precedent for success in other public health endeavors of comparable or greater complexity and scope. This must be a national effort, with special attention to communities that experience health disparities and that have social and physical environments unsupportive of healthful nutrition and physical activity.

### A NATIONAL PUBLIC HEALTH PRIORITY

Just as broad-based approaches have been used to address other public health concerns—including automobile safety and tobacco use—obesity prevention should be public health in action at its broadest and most inclusive level. **Prevention of obesity in children and youth should be a national public health priority.**

Across the country, obesity prevention efforts have already begun, and although the ultimate solutions are still far off, there is great potential at present for pursuing innovative approaches and creating linkages that permit the cross-fertilization of ideas. Current efforts range from new school board policies and state legislation regarding school physical education requirements and nutrition standards for beverages and foods sold in schools to community initiatives to expand bike paths and improve recreational facilities. Parallel and synergistic efforts to prevent adult obesity, which will contribute to improvements in health for the entire U.S. population, are also beginning. Grassroots efforts made by citizens and organizations will likely drive many of the obesity prevention efforts at the local level and can be instrumental in driving policies and legislation at the state and national levels.

The additional impetus that is needed is the political will to make childhood obesity prevention a national public health priority. Obesity prevention efforts nationwide will require federal, state, and local governments to commit adequate and sustained resources for surveillance, research, public health programs, evaluation, and dissemination. The federal government has had a longstanding commitment to programs that address nutritional deficiencies (beginning in the 1930s) and encourage physical fitness, but only recently has obesity been targeted. The federal government should demonstrate effective leadership by making a sustained commitment to support policies and programs that are commensurate to the scale of the problem. Furthermore, leadership in this endeavor will require coordination of federal efforts with state and community efforts, complemented by engagement of the private sector in developing constructive, socially responsible, and potentially profitable approaches to the promotion of a healthy weight.

State and local governments have especially important roles to play in obesity prevention, as they can focus on the specific needs of their state, cities, and neighborhoods. Many of the issues involved in preventing childhood obesity—including actions on street and neighborhood design, plans for parks and community recreational facilities, and loca-

tions of new schools and retail food facilities—require decisions by county, city, or town officials.

Rigorous evaluation of obesity prevention interventions is essential. Only through careful evaluation can prevention interventions be refined; those that are unsuccessful can be discontinued or refocused, and those that are successful can be identified, replicated, and disseminated.

**Recommendation 1: National Priority**

**Government at all levels should provide coordinated leadership for the prevention of obesity in children and youth. The President should request that the Secretary of the Department of Health and Human Services convene a high-level task force to ensure coordinated budgets, policies, and program requirements and to establish effective interdepartmental collaboration and priorities for action. An increased level and sustained commitment of federal and state funds and resources are needed.**

**To implement this recommendation, the federal government should:**

- **Strengthen research and program efforts addressing obesity prevention, with a focus on experimental behavioral research and community-based intervention research and on the rigorous evaluation of the effectiveness, cost-effectiveness, sustainability, and scaling up of effective prevention interventions**
- **Support extensive program and research efforts to prevent childhood obesity in high-risk populations with health disparities, with a focus both on behavioral and environmental approaches**
- **Support nutrition and physical activity grant programs, particularly in states with the highest prevalence of childhood obesity**
- **Strengthen support for relevant surveillance and monitoring efforts, particularly the National Health and Nutrition Examination Survey (NHANES)**
- **Undertake an independent assessment of federal nutrition assistance programs and agricultural policies to ensure that they promote healthful dietary intake and physical activity levels for all children and youth**



- **Develop and evaluate pilot projects within the nutrition assistance programs that would promote healthful dietary intake and physical activity and scale up those found to be successful.**

**To implement this recommendation, state and local governments should:**

- **Provide coordinated leadership and support for childhood obesity prevention efforts, particularly those focused on high-risk populations, by increasing resources and strengthening policies that promote opportunities for physical activity and healthful eating in communities, neighborhoods, and schools**
- **Support public health agencies and community coalitions in their collaborative efforts to promote and evaluate obesity prevention interventions.**

### **HEALTHY MARKETPLACE AND MEDIA ENVIRONMENTS**

Children, youth, and their families are surrounded by a commercial environment that strongly influences their purchasing and consumption behaviors. Consumers may initially be unsure about what to eat for good health. They often make immediate trade-offs in taste, cost, and convenience for longer term health. The food, beverage, restaurant, entertainment, leisure, and recreation industries share in the responsibilities for childhood obesity prevention and can be instrumental in supporting this goal. Federal agencies can strengthen industry efforts through general support, technical assistance, research expertise, and regulatory guidance.

Some leaders in the food industry are already making changes to expand healthier options for young consumers, offer products with reduced energy content, and reduce portion sizes. These changes must be adopted on a much larger scale, however, and marketed in ways that make acceptance by consumers (who may now have acquired entrenched preferences for many less healthful products) more likely. Coordinated efforts among the private sector, government, and other groups are also needed to create, support, and sustain consumer demand for healthful food and

beverage products, appropriately portioned restaurant and take-out meals, and accurate and consistent nutritional information through food labels, health claims, and other educational sources. Similarly, the leisure, entertainment, and recreation industries have opportunities to innovate in favor of stimulating physical activity—as opposed to sedentary or passive-leisure pursuits—and portraying active living as a desirable social norm for adults and children.

Children's health-related behaviors are influenced by exposure to media messages involving foods, beverages, and physical activity. Research has shown that television advertising can especially affect children's food knowledge, choices, and consumption of particular food products, as well as their food-purchase decisions made directly and indirectly (through parents). Because young children under 8 years of age are often unable to distinguish between information and the persuasive intent of advertising, the committee recommends the development of guidelines for advertising and marketing of foods, beverages, and sedentary entertainment to children.

Media messages can also be inherently positive. There is great potential for the media and entertainment industries to encourage a balanced diet, healthful eating habits, and regular physical activity, thereby influencing social norms about obesity in children and youth and helping to spur the actions needed to prevent it. Public education messages in multiple types of media are needed to generate support for policy changes and provide messages to the general public, parents, children, and adolescents.

**Recommendation 2: Industry**

**Industry should make obesity prevention in children and youth a priority by developing and promoting products, opportunities, and information that will encourage healthful eating behaviors and regular physical activity.**

**To implement this recommendation:**

- **Food and beverage industries should develop product and packaging innovations that consider energy density, nutrient density, and standard serving sizes to help consumers make healthful choices.**
- **Leisure, entertainment, and recreation industries should develop products and opportunities that pro-**

mote regular physical activity and reduced sedentary behaviors.

- Full service and fast food restaurants should expand healthier food options and provide calorie content and general nutrition information at point of purchase.

**Recommendation 3: Nutrition Labeling**

Nutrition labeling should be clear and useful so that parents and youth can make informed product comparisons and decisions to achieve and maintain energy balance at a healthy weight.

**To implement this recommendation:**

- The Food and Drug Administration should revise the Nutrition Facts panel to prominently display the total calorie content for items typically consumed at one eating occasion in addition to the standardized calorie serving and the percent Daily Value.
- The Food and Drug Administration should examine ways to allow greater flexibility in the use of evidence-based nutrient and health claims regarding the link between the nutritional properties or biological effects of foods and a reduced risk of obesity and related chronic diseases.
- Consumer research should be conducted to maximize use of the nutrition label and other food-guidance systems.

**Recommendation 4: Advertising and Marketing**

Industry should develop and strictly adhere to marketing and advertising guidelines that minimize the risk of obesity in children and youth.

**To implement this recommendation:**

- The Secretary of the Department of Health and Human Services should convene a national conference to develop guidelines for the advertising and marketing of foods, beverages, and sedentary entertainment di-

rected at children and youth with attention to product placement, promotion, and content.

- Industry should implement the advertising and marketing guidelines.
- The Federal Trade Commission should have the authority and resources to monitor compliance with the food and beverage and sedentary entertainment advertising practices.

**Recommendation 5: Multi-Media and Public Relations Campaign**

The Department of Health and Human Services should develop and evaluate a long-term national multi-media and public relations campaign focused on obesity prevention in children and youth.

To implement this recommendation:

- The campaign should be developed in coordination with other federal departments and agencies and with input from independent experts to focus on: building support for policy changes; providing information to parents; and providing information to children and youth. Rigorous evaluation should be a critical component.
- Reinforcing messages should be provided in diverse media and effectively coordinated with other events and dissemination activities.
- The media should incorporate obesity issues into its content, including the promotion of positive role models.

## HEALTHY COMMUNITIES

Encouraging children and youth to be physically active involves providing them with places where they can safely walk, bike, run, skate, play games, or engage in other activities that expend energy. But practices that guide the development of streets and neighborhoods often place

the needs of motorized vehicles over the needs of pedestrians and bicyclists. Local governments should find ways to increase opportunities for physical activity in their communities by examining zoning ordinances and priorities for capital investment.

Community actions need to engage child- and youth-centered organizations, social and civic organizations, faith-based groups, and many other community partners. Community coalitions can coordinate their efforts and leverage and network resources. Specific attention must be given to children and youth who are at high risk for becoming obese; this includes children in populations with higher obesity prevalence rates and longstanding health disparities such as African Americans, Hispanic Americans, and American Indians, or families of low socioeconomic status. Children with at least one obese parent are also at high risk.

Health-care professionals, including physicians, nurses, and other clinicians, have a vital role to play in preventing childhood obesity. As advisors both to children and their parents, they have the access and influence to discuss the child's weight status with the parents (and child as age appropriate) and make credible recommendations on dietary intake and physical activity throughout children's lives. They also have the authority to encourage action by advocating for prevention efforts.

#### **Recommendation 6: Community Programs**

**Local governments, public health agencies, schools, and community organizations should collaboratively develop and promote programs that encourage healthful eating behaviors and regular physical activity, particularly for populations at high risk of childhood obesity. Community coalitions should be formed to facilitate and promote cross-cutting programs and community-wide efforts.**

#### **To implement this recommendation:**

- **Private and public efforts to eliminate health disparities should include obesity prevention as one of their primary areas of focus and should support community-based collaborative programs to address social, economic, and environmental barriers that contribute to the increased obesity prevalence among certain populations.**

- **Community child- and youth-centered organizations should promote healthful eating behaviors and regular physical activity through new and existing programs that will be sustained over the long term.**
- **Community evaluation tools should incorporate measures of the availability of opportunities for physical activity and healthful eating.**
- **Communities should improve access to supermarkets, farmers' markets, and community gardens to expand healthful food options, particularly in low-income and underserved areas.**

**Recommendation 7: Built Environment**

**Local governments, private developers, and community groups should expand opportunities for physical activity including recreational facilities, parks, playgrounds, sidewalks, bike paths, routes for walking or biking to school, and safe streets and neighborhoods, especially for populations at high risk of childhood obesity.**

**To implement this recommendation:**

**Local governments, working with private developers and community groups should:**

- **Revise comprehensive plans, zoning and subdivision ordinances, and other planning practices to increase availability and accessibility of opportunities for physical activity in new developments**
- **Prioritize capital improvement projects to increase opportunities for physical activity in existing areas**
- **Improve the street, sidewalk, and street-crossing safety of routes to school, develop programs to encourage walking and bicycling to school, and build schools within walking and bicycling distance of the neighborhoods they serve.**

**Community groups should:**

- **Work with local governments to change their planning and capital improvement practices to give higher priority to opportunities for physical activity.**

**The Department of Health and Human Services (DHHS) and the Department of Transportation should:**

- **Fund community-based research to examine the impact of changes to the built environment on the levels of physical activity in the relevant communities and populations.**

**Recommendation 8: Health Care**

**Pediatricians, family physicians, nurses, and other clinicians should engage in the prevention of childhood obesity. Health-care professional organizations, insurers, and accrediting groups should support individual and population-based obesity prevention efforts.**

**To implement this recommendation:**

- **Health-care professionals should routinely track body mass index, offer relevant evidence-based counseling and guidance, serve as role models, and provide leadership in their communities for obesity prevention efforts.**
- **Professional organizations should disseminate evidence-based clinical guidance and establish programs on obesity prevention.**
- **Training programs and certifying entities should require obesity prevention knowledge and skills in their curricula and examinations.**
- **Insurers and accrediting organizations should provide incentives for maintaining healthy body weight and include screening and obesity preventive services in routine clinical practice and quality assessment measures.**

## HEALTHY SCHOOL ENVIRONMENT

Schools are one of the primary locations for reaching the nation's children and youth. In 2000, 53.2 million students were enrolled in public and private elementary and secondary schools in the United States. In addition, schools often serve as the sites for pre-school, child-care, and after-school programs. Both inside and outside of the classroom, schools present opportunities for the concepts of energy balance to be taught and put into practice as students learn about good nutrition, physical activity, and their relationships to health; engage in physical education; and make food and physical activity choices during school meal times and through school-related activities.

All foods and beverages sold or served to students in school should be healthful and meet an accepted nutritional content standard. However, many of the "competitive foods" now sold in school cafeterias, vending machines, school stores, and school fundraisers are high in calories and low in nutritional value. At present, federal standards for the sale of competitive foods in schools are only minimal.

In addition, many schools around the nation have reduced their commitment to provide students with regular and adequate physical activity, often as a result of budget cuts or pressures to increase academic-course offerings, even though it is generally recommended that children accumulate a minimum of 60 minutes of moderate to vigorous physical activity each day. Given that children spend over half of their day in school, it is not unreasonable to expect that they participate in at least 30 minutes of moderate to vigorous physical activity during the school day.

Schools offer many other opportunities for learning and practicing healthful eating and physical activity behaviors. Coordinated changes in the curriculum, the in-school advertising environment, school health services, and after-school programs all offer the potential to advance obesity prevention. Furthermore, it is important for parents to be aware of their child's weight status. Schools can assist in providing BMI, weight, and height information to parents and to children (as age appropriate) while being sure to sensitively collect and report on that information.

### **Recommendation 9: Schools**

**Schools should provide a consistent environment that is conducive to healthful eating behaviors and regular physical activity.**



**To implement this recommendation:**

**USDA, state and local authorities, and schools should:**

- **Develop and implement nutritional standards for all competitive foods and beverages sold or served in schools**
- **Ensure that all school meals meet the Dietary Guidelines for Americans**
- **Develop, implement, and evaluate pilot programs to extend school meal funding in schools with a large percentage of children at high risk of obesity.**

**State and local education authorities and schools should:**

- **Ensure that all children and youth participate in a minimum of 30 minutes of moderate to vigorous physical activity during the school day**
- **Expand opportunities for physical activity through: physical education classes; intramural and interscholastic sports programs and other physical activity clubs, programs, and lessons; after-school use of school facilities; use of schools as community centers; and walking- and biking-to-school programs**
- **Enhance health curricula to devote adequate attention to nutrition, physical activity, reducing sedentary behaviors, and energy balance, and to include a behavioral skills focus**
- **Develop, implement, and enforce school policies to create schools that are advertising-free to the greatest possible extent**
- **Involve school health services in obesity prevention efforts**
- **Conduct annual assessments of each student's weight, height, and gender- and age-specific BMI percentile and make this information available to parents**

- **Perform periodic assessments of each school's policies and practices related to nutrition, physical activity, and obesity prevention.**

**Federal and state departments of education and health and professional organizations should:**

- **Develop, implement, and evaluate pilot programs to explore innovative approaches to both staffing and teaching about wellness, healthful choices, nutrition, physical activity, and reducing sedentary behaviors. Innovative approaches to recruiting and training appropriate teachers are also needed.**

## **HEALTHY HOME ENVIRONMENT**

Parents (defined broadly to include primary caregivers) have a profound influence on their children by fostering certain values and attitudes, by rewarding or reinforcing specific behaviors, and by serving as role models. A child's health and well-being are thus enhanced by a home environment with engaged and skillful parenting that models, values, and encourages healthful eating habits and a physically active lifestyle. Economic and time constraints, as well as the stresses and challenges of daily living, may make healthful eating and increased physical activity a difficult reality on a day-to-day basis for many families.

Parents play a fundamental role as household policy makers. They make daily decisions on recreational opportunities, food availability at home, and children's allowances; they determine the setting for foods eaten in the home; and they implement countless other rules and policies that influence the extent to which various members of the family engage in healthful eating and physical activity. Older children and youth, meanwhile, have responsibilities to be aware of their own eating habits and activity patterns and to engage in health-promoting behaviors.

### **Recommendation 10: Home**

**Parents should promote healthful eating behaviors and regular physical activity for their children.**

**To implement this recommendation parents can:**

- **Choose exclusive breastfeeding as the method for feeding infants for the first four to six months of life**
- **Provide healthful food and beverage choices for children by carefully considering nutrient quality and energy density**
- **Assist and educate children in making healthful decisions regarding types of foods and beverages to consume, how often, and in what portion size**
- **Encourage and support regular physical activity**
- **Limit children's television viewing and other recreational screen time to less than two hours per day**
- **Discuss weight status with their child's health-care provider and monitor age- and gender-specific BMI percentile**
- **Serve as positive role models for their children regarding eating and physical-activity behaviors.**

**CONFRONTING THE CHILDHOOD OBESITY EPIDEMIC**

The committee acknowledges, as have many other similar efforts, that obesity prevention is a complex issue, that a thorough understanding of the causes and determinants of the obesity epidemic is lacking, and that progress will require changes not only in individual and family behaviors but also in the marketplace and the social and built environments (Box ES-2). As the nation focuses on obesity as a health problem and begins to address the societal and cultural issues that contribute to excess weight, poor food choices, and inactivity, many different stakeholders will need to make difficult tradeoffs and choices. However, as institutions, organizations, and individuals across the nation begin to make changes, societal norms are likely to change as well; in the long-term, we can become a nation where proper nutrition and physical activity that support energy balance at a healthy weight will become the standard.

Recognizing the multifactorial nature of the problem, the committee deliberated on how best to prioritize the next steps for the nation in preventing obesity in children and youth. The traditional method of prioritizing recommendations of this nature would be to base these decisions

**BOX ES-2**

**Summary of Findings and Conclusions**

- Childhood obesity is a serious nationwide health problem requiring urgent attention and a population-based prevention approach so that all children may grow up physically and emotionally healthy.
- Preventing obesity involves healthful eating behaviors and regular physical activity—with the goal of achieving and maintaining energy balance at a healthy weight.
- Individual efforts and societal changes are needed. Multiple sectors and stakeholders must be involved.

on the strength of the scientific evidence demonstrating that specific interventions have a direct impact on reducing obesity prevalence and to order the evidence-based approaches based on the balance between potential benefits and associated costs including potential risks. However, a robust evidence base is not yet available. Instead, we are in the midst of compiling that much-needed evidence at the same time that there is an urgent need to respond to this epidemic of childhood obesity. Therefore, the committee used the best scientific evidence available—including studies with obesity as the outcome measure and studies on improving dietary behaviors, increasing physical activity levels, and reducing sedentary behaviors, as well as years of experience and study on what has worked in addressing similar public health challenges—to develop the recommendations presented in this report.

As evidence was limited, yet the health concerns are immediate and warrant preventive action, it is an explicit part of the committee's recommendations that all the actions and initiatives include evaluation efforts to help build the evidence base that continues to be needed to more effectively fight this epidemic.

From the ten recommendations presented above, the committee has identified a set of immediate steps based on the short-term feasibility of the actions and the need to begin a well-rounded set of changes that recognize the diverse roles of multiple stakeholders (Table ES-1). In discussions and interactions that have already begun and will follow with this report, each community and stakeholder group will determine their own set of priorities and next steps. Furthermore, action is urged for all areas

of the report's recommendations, as the list in Table ES-1 is only meant as a starting point.

The committee was also asked to set forth research priorities. There is still much to be learned about the causes, correlates, prevention, and treatment of obesity in children and youth. Because the focus of this study is on prevention, the committee concentrated its efforts throughout the report on identifying areas of research that are priorities for progress toward preventing childhood obesity. The three research priorities discussed throughout the report are:

- **Evaluation of obesity prevention interventions**—The committee encourages the evaluation of interventions that focus on preventing an increase in obesity prevalence, improving dietary behaviors, increasing physical activity levels, and reducing sedentary behaviors. Specific policy, environmental, social, clinical, and behavioral intervention approaches should be examined for their feasibility, efficacy, effectiveness, and sustainability. Evaluations may be in the form of randomized controlled trials and quasi-experimental trials. Cost effectiveness research should be an important component of evaluation efforts.
- **Behavioral research**—The committee encourages experimental research examining the fundamental factors involved in changing dietary behaviors, physical activity levels, and sedentary behaviors. This research should inform new intervention strategies that are implemented and tested at individual, family, school, community, and population levels. This would include studies that focus on factors promoting motivation to change behavior, strategies to reinforce and sustain improved behavior, identification and removal of barriers to change, and specific ethnic and cultural influences on behavioral change.
- **Community-based population-level research**—The committee encourages experimental and observational research examining the most important established and novel factors that drive changes in population health, how they are embedded in the socioeconomic and built environments, how they impact obesity prevention, and how they affect society at large with regard to improving nutritional health, increasing physical activity, decreasing sedentary behaviors, and reducing obesity prevalence.

The recommendations that constitute this report’s action plan to prevent childhood obesity commence what is anticipated to be an energetic and sustained effort. Some of the recommendations can be implemented immediately and will cost little, while others will take a larger economic investment and require a longer time for implementation and to see the benefits of the investment. Some will prove useful, either quickly or over the longer term, while others will prove unsuccessful. Knowing that it is impossible to produce an optimal solution a priori, we more appropriately adopt surveillance, trial, measurement, error, success, alteration, and dissemination as our course, to be embarked on immediately. Given that the health of today’s children and future generations is at stake, we must proceed with all due urgency and vigor.

**TABLE ES-1** Immediate Steps

Federal government	<ul style="list-style-type: none"><li>• Establish an interdepartmental taskforce and coordinate federal actions</li><li>• Develop nutrition standards for foods and beverages sold in schools</li><li>• Fund state-based nutrition and physical-activity grants with strong evaluation components</li><li>• Develop guidelines regarding advertising and marketing to children and youth by convening a national conference</li><li>• Expand funding for prevention intervention research, experimental behavioral research, and community-based population research; strengthen support for surveillance, monitoring, and evaluation efforts</li></ul>
Industry and media	<ul style="list-style-type: none"><li>• Develop healthier food and beverage product and packaging innovations</li><li>• Expand consumer nutrition information</li><li>• Provide clear and consistent media messages</li></ul>
State and local governments	<ul style="list-style-type: none"><li>• Expand and promote opportunities for physical activity in the community through changes to ordinances, capital improvement programs, and other planning practices</li><li>• Work with communities to support partnerships and networks that expand the availability of and access to healthful foods</li></ul>

Health-care professionals	<ul style="list-style-type: none"><li>• Routinely track BMI in children and youth and offer appropriate counseling and guidance to children and their families</li></ul>
Community and nonprofit organizations	<ul style="list-style-type: none"><li>• Provide opportunities for healthful eating and physical activity in existing and new community programs, particularly for high-risk populations</li></ul>
State and local education authorities and schools	<ul style="list-style-type: none"><li>• Improve the nutritional quality of foods and beverages served and sold in schools and as part of school-related activities</li><li>• Increase opportunities for frequent, more intensive and engaging physical activity during and after school</li><li>• Implement school-based interventions to reduce children’s screen time</li><li>• Develop, implement, and evaluate innovative pilot programs for both staffing and teaching about wellness, healthful eating, and physical activity</li></ul>
Parents and families	<ul style="list-style-type: none"><li>• Engage in and promote more healthful dietary intakes and active lifestyles (e.g., increased physical activity, reduced television and other screen time, more healthful dietary behaviors)</li></ul>

---

# Preventing Childhood Obesity

## Health in the Balance

Committee on Prevention of Obesity in Children and Youth

Food and Nutrition Board  
Board on Health Promotion and Disease Prevention

Jeffrey P. Koplan, Catharyn T. Liverman, Vivica I. Kraak, *Editors*

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The serpent has been a symbol of long life, healing, and knowledge among almost all cultures and religions since the beginning of recorded history. The serpent adopted as a logotype by the Institute of Medicine is a relief carving from ancient Greece, now held by the Staatliche Museen in Berlin.

*“Knowing is not enough; we must apply.  
Willing is not enough; we must do.”*  
—Goethe



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This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of this report:

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Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations nor did they see the final draft of the report before its release. The review of this report was overseen by **ENRIQUETA C. BOND**, Burroughs Wellcome Fund and **GORDON H. DEFRIESE**, Department of Social Medicine, University of North Carolina at Chapel Hill

Appointed by the National Research Council, they were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

## Preface

In 2001, the U.S. Surgeon General issued the *Call to Action to Prevent and Decrease Overweight and Obesity* to stimulate the development of specific agendas and actions targeting this public health problem. In recognition of the need for greater attention directed to prevent childhood obesity, Congress, through the FY 2002 Labor/Health and Human Services/Education Appropriations Act Conference Report, directed the Centers for Disease Control and Prevention (CDC) to request that the Institute of Medicine (IOM) develop an action plan targeted to the prevention of obesity in children and youth in the United States. In addition to CDC, this study was supported by the Department of Health and Human Services' Office of Disease Prevention and Health Promotion (ODPHP); National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK); the National Heart, Lung, and Blood Institute (NHLBI); the National Institute of Child Health and Human Development (NICHD); and the Division of Nutrition Research Coordination of the National Institutes of Health; and The Robert Wood Johnson Foundation (RWJF).

The charge to the IOM committee was to develop a prevention-focused action plan to decrease the prevalence of obesity in children and youth in the United States. The primary emphasis of the study's task was on examining the behavioral and cultural factors, social constructs, and other broad environmental factors involved in childhood obesity and identifying promising approaches for prevention efforts. To address this charge, the IOM appointed a 19-member multidisciplinary committee with expertise in child health and development, obesity, nutrition, physical activity, economics, education, public policy, and public health. Six meetings were held during the 24-month study and a variety of

sources informed the committee's work. The committee obtained information through a literature review (Appendix C) and a commissioned paper discussing insights, strategies, and lessons learned from other public health issues and social change campaigns that might be relevant to the prevention of obesity in children and youth (Appendix D). The meetings included two workshops that were key elements of the committee's information-gathering process (Appendix E). Held in June 2003, the first workshop focused on strategies for developing school-based policies to promote nutrition and physical activity in children and youth. The second workshop was organized in December 2003 and addressed marketing and media influences on preventing childhood obesity and issues related to family dynamics. Each workshop included public forum sessions, and the committee benefited from the breadth of issues raised by nonprofit organizations, professional associations, and individuals.

Since the inception of this study, the committee recognized that it faced a broad task and a complex problem that has become an epidemic not only in the United States but also internationally. The committee appreciated the opportunity to develop an action plan on the prevention of obesity in children and youth and developed its recommendations to encompass the roles and responsibilities of numerous stakeholders and many sectors of society.

Children are highly cherished in our society. The value we attach to our children is fundamentally connected to society's responsibility to provide for their growth, development, and well-being. Extensive discussions will need to continue beyond this report so that shared understandings are reached and support is garnered for sustained societal and lifestyle changes that will reverse the obesity trends among our children and youth.

Jeffrey P. Koplan, *Chair*  
Committee on Prevention of Obesity in  
Children and Youth

## Acknowledgments

It was a privilege to chair this Institute of Medicine (IOM) committee whose members not only brought their breadth and depth of expertise to this important topic but were actively engaged in the committee's work. This report represents the result of six meetings, two open sessions, numerous emails and phone conferences, and the extensive analysis and thoughtful writing contributed by the committee members who volunteered their time to work on this study. I thank each of the committee members for their dedication and perseverance in working through the diversity of issues in a truly interdisciplinary collaboration.

The committee greatly benefited from the opportunity for discussion with the individuals who made presentations and attended the committee's workshops and meetings, including: Neal Baer, Kelly Brownell, Harold Goldstein, Paula Hudson Collins, Mary Engle, Susan McHale, Alex Molnar, Eric Rosenthal, Mark Vallianatos, Jennifer Wilkins, and Judith Young, as well as all those who spoke during the open forums (Appendix E).

This study was sponsored by the U.S. Department of Health and Human Services' Centers for Disease Control and Prevention; Office of Disease Prevention and Health Promotion; National Heart, Lung, and Blood Institute; National Institute of Diabetes and Digestive and Kidney Diseases; National Institute of Child Health and Human Development; and the Division of Nutrition Research Coordination of the National Institutes of Health; and The Robert Wood Johnson Foundation. The committee thanks Terry Bazzarre, William Dietz, Karen Donato, Gilman Grave, Van Hubbard, Woodie Kessel, Kathryn McMurry, Pamela Starke-Reed, Susan Yanovski, and their colleagues for their support and guidance on the committee's task.

This study was conducted in collaboration with the IOM Board on Health Promotion and Disease Prevention (HPDP) Board, and we wish to thank both Rose Martinez, director of the HPDP Board, for her thoughtful interactions and discussions with the committee, and Carrie Szlyk, who was of great assistance in the early phases of this study.

We appreciate the extensive analysis of lessons learned from other public health efforts and their relevance to preventing childhood obesity written by Michael Eriksen (Appendix D). Many thanks to Sally Ann Lederman and Lynn Parker for their technical review of sections of the report. Kathi Hanna's work as a consultant, financial oversight by Elisabeth Rimaud, and the editing work of Steven Marcus, Laura Penny, and Tom Burroughs are also greatly appreciated. The work of Rebecca Klima-Hudson and Stephanie Deutsch is also most appreciated. The report has been enhanced by the artwork of Becky Heavner, and we thank her for these creative efforts.

Last, but not least, I would like to thank the Food and Nutrition Board study staff, Linda Meyers, Cathy Liverman, Vivica Kraak, Janice Okita, Tazima Davis, and Shannon Ruddy, for their extraordinary competence, diligence, wisdom and intellectual openness. Their in-depth knowledge of the subject matter, keen sense of policy and practice, and willingness to constantly work and revise to make this document as useful, thoughtful, and accurate as possible was invaluable in its creation.

*Preventing Childhood Obesity: Health in the Balance* presents a set of recommendations that, when implemented together, will catalyze synergistic actions among families, communities, schools, and the public and private sectors to effectively prevent the large majority of children and youth in the United States from becoming obese. Although the committee members have diverse backgrounds, over the course of this study we have gained a deeper appreciation for the difficulty and complexity of the steps necessary to prevent obesity in our nation's youth. We provide this guidance with the hope that it will benefit the health of our nation and future generations.

Jeffrey P. Koplan, *Chair*  
Committee on Prevention of Obesity in  
Children and Youth

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